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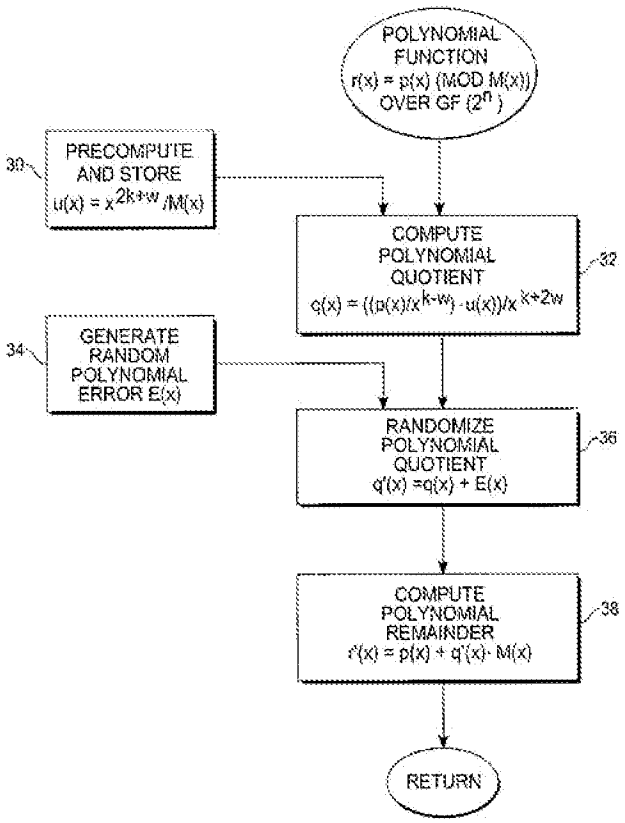
(54) Title: RANDOMIZED MODULAR POLYNOMIAL REDUCTION METHOD AND HARDWARE THEREFOR



(57) Abstract: A cryptographically secure, computer hardware-implemented binary finite-field polynomial modular reduction method estimates (32) and randomizes (36) a polynomial quotient q' (x) used for computation of a polynomial remainder. The randomizing error E (x) injected into the approximate polynomial quotient q (x) is limited to a few bits, e.g. less than half a word. The computed (38) polynomial remainder r' (x) is congruent with but a small random multiple of the residue r (x), which can be found by a final strict binary field reduction by the modulus M (x). In addition to a computational unit (10) and operations sequencer (16), the computing hardware also includes a random or pseudo-random number generator (20) for producing the random polynomial error. The modular reduction method thus resists hardware cryptoanalysis attacks, such as timing and power analysis attacks.

WO 2006/124160 A3

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

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- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

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International application No.
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A. CLASSIFICATION OF SUBJECT MATTER
IPC(8): H04L 9/00 (2007.01)
USPC: 713/174
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
USPC: 713/174

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC: 713/165

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
pubWEST(PGPB,USPT,EPAB,JPAB); DialogPRO(Engineering); Google Scholar.
Search terms: cryptographically secure, computer hardware, finite-field, elliptical curve, polynomial, randomize

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/0055962 A1 (SCHROEPPEL) 09 May 2002 (09.05.2002) entire document, especially para [0044]-[0050], [0078] and FIG.3.	1-11
A	Morales-Sandoval, et al. On the hardware design of an elliptic curve cryptosystem. In Computer Science, 2004. ENC 2004. Proceedings of the Fifth Mexican International Conference in, Posted online 2004-10-18 08:49:27.0 (retrieved on 2007-06-12). Retrieved from the internet: <URL: http://ccc.inaoep.mx/~cferegrino/Publicaciones/articulos/OntheHardwareDesign%20of%20an%20Elliptic%20Curve%20Criptosystem_ENC04_MiguelMorales.pdf >	1-11

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
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